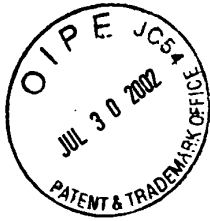


34/1



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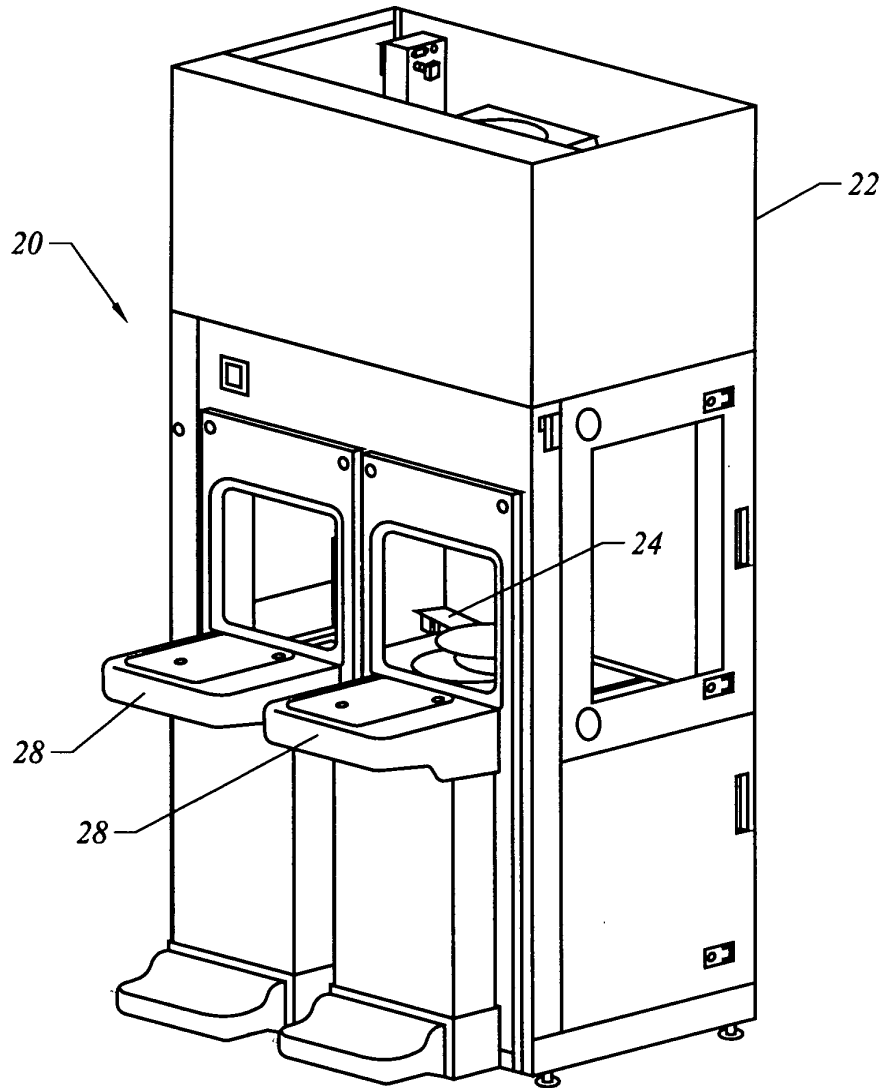


FIG. 1

10087092.073002



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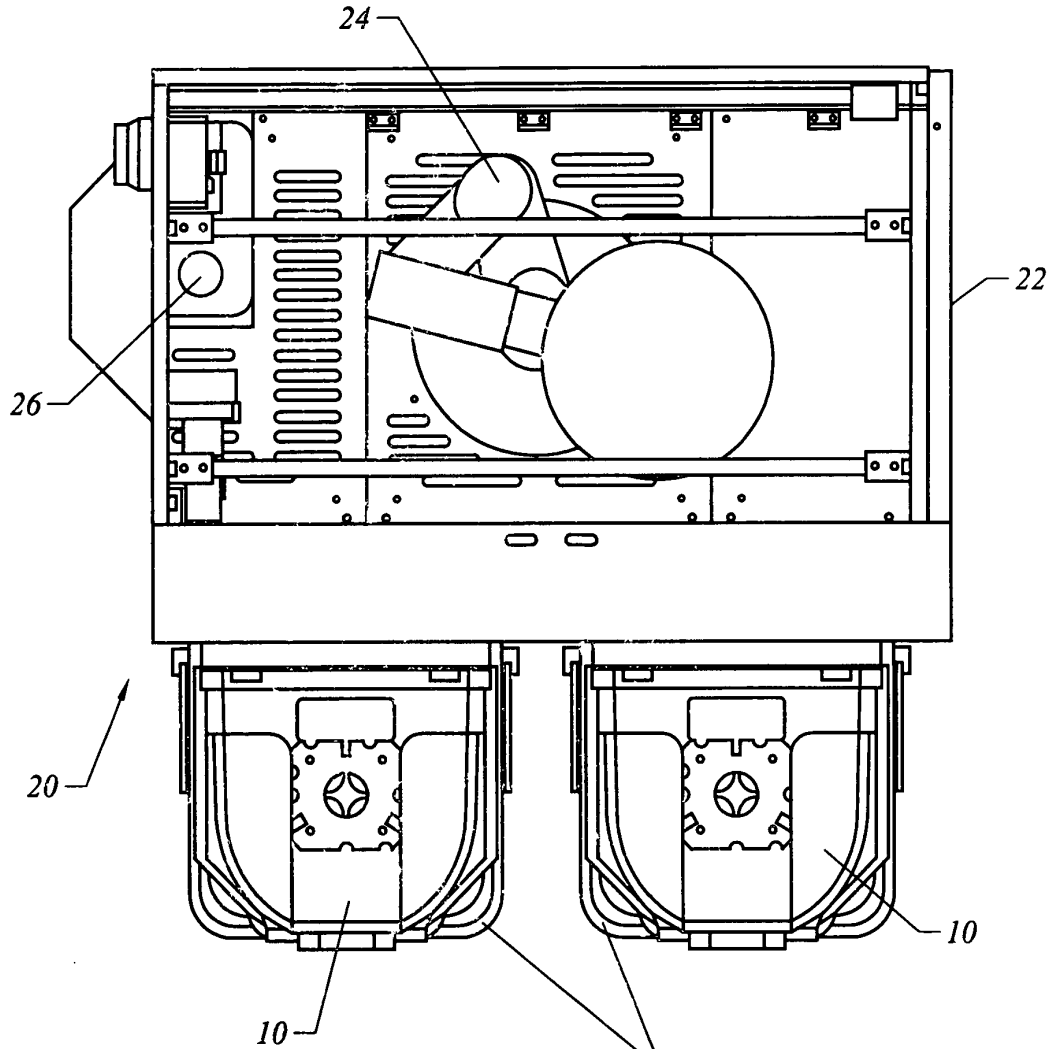


FIG. 2

20020726048001



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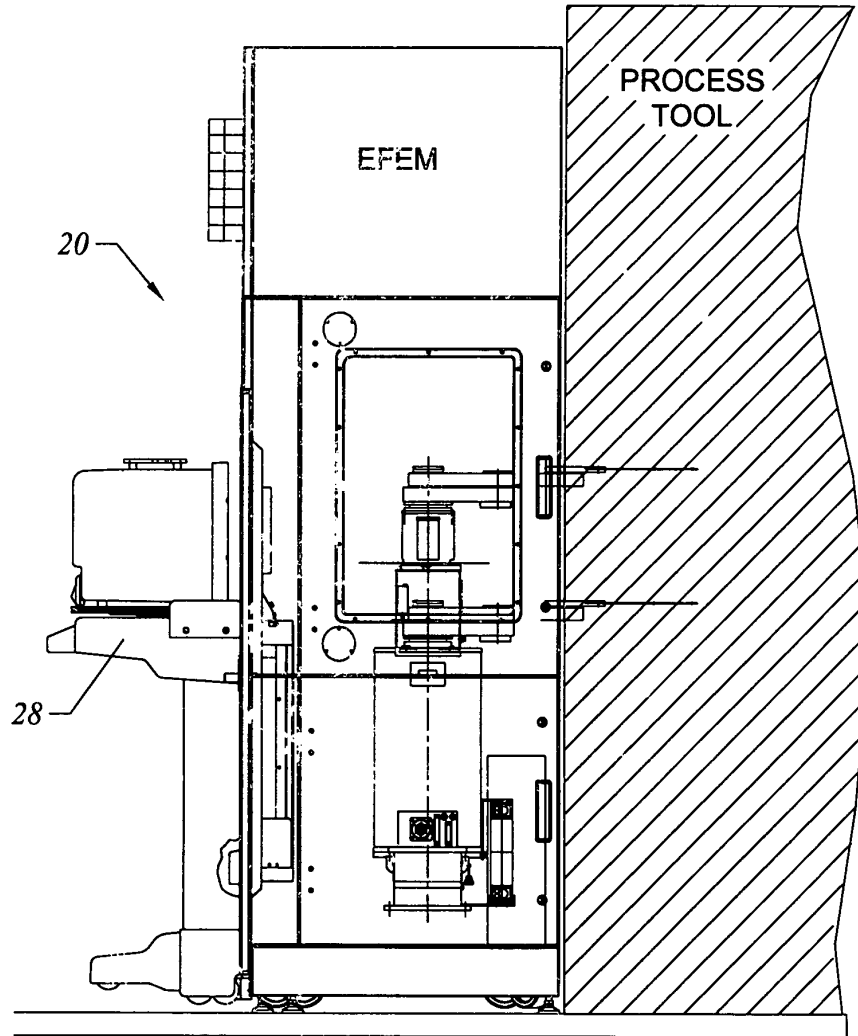


FIG. 3

10087092 073002



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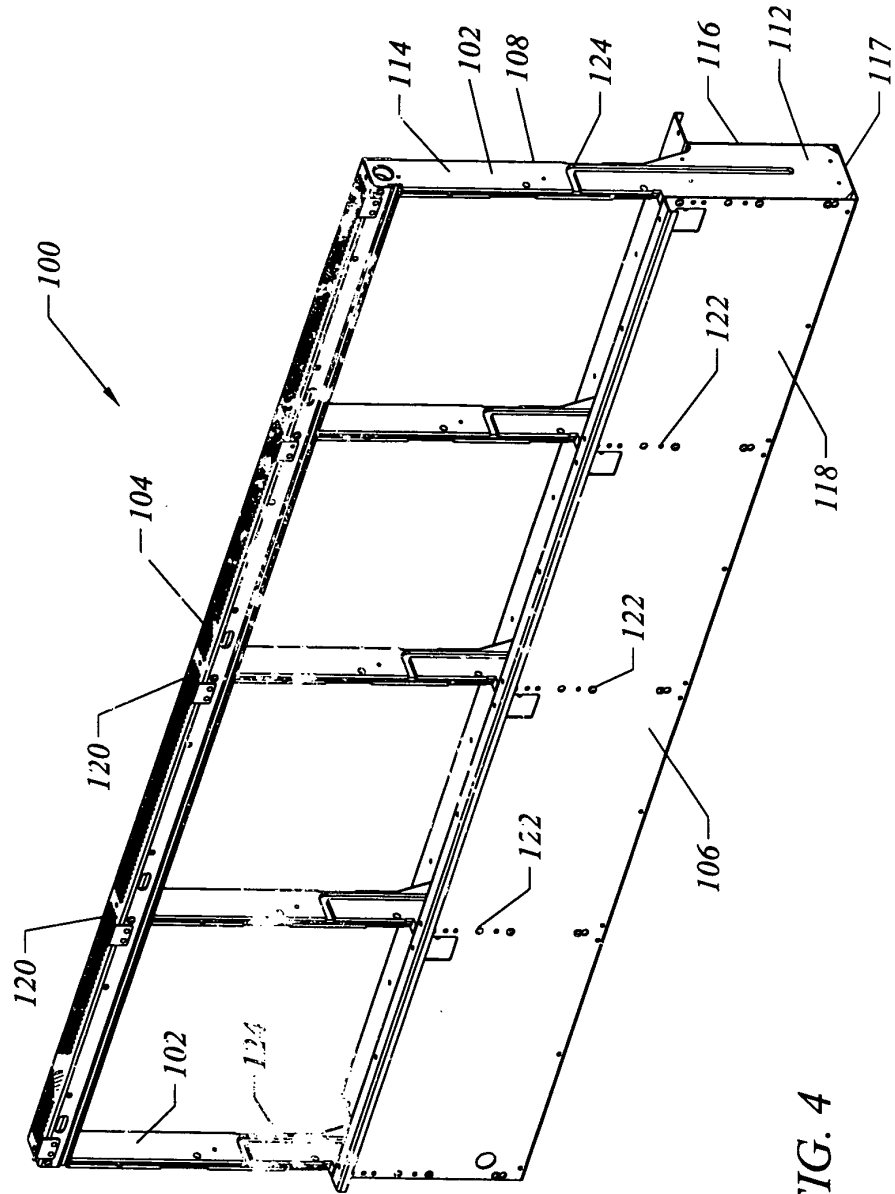


FIG. 4

200E20 260/800T

200E20" 26048001



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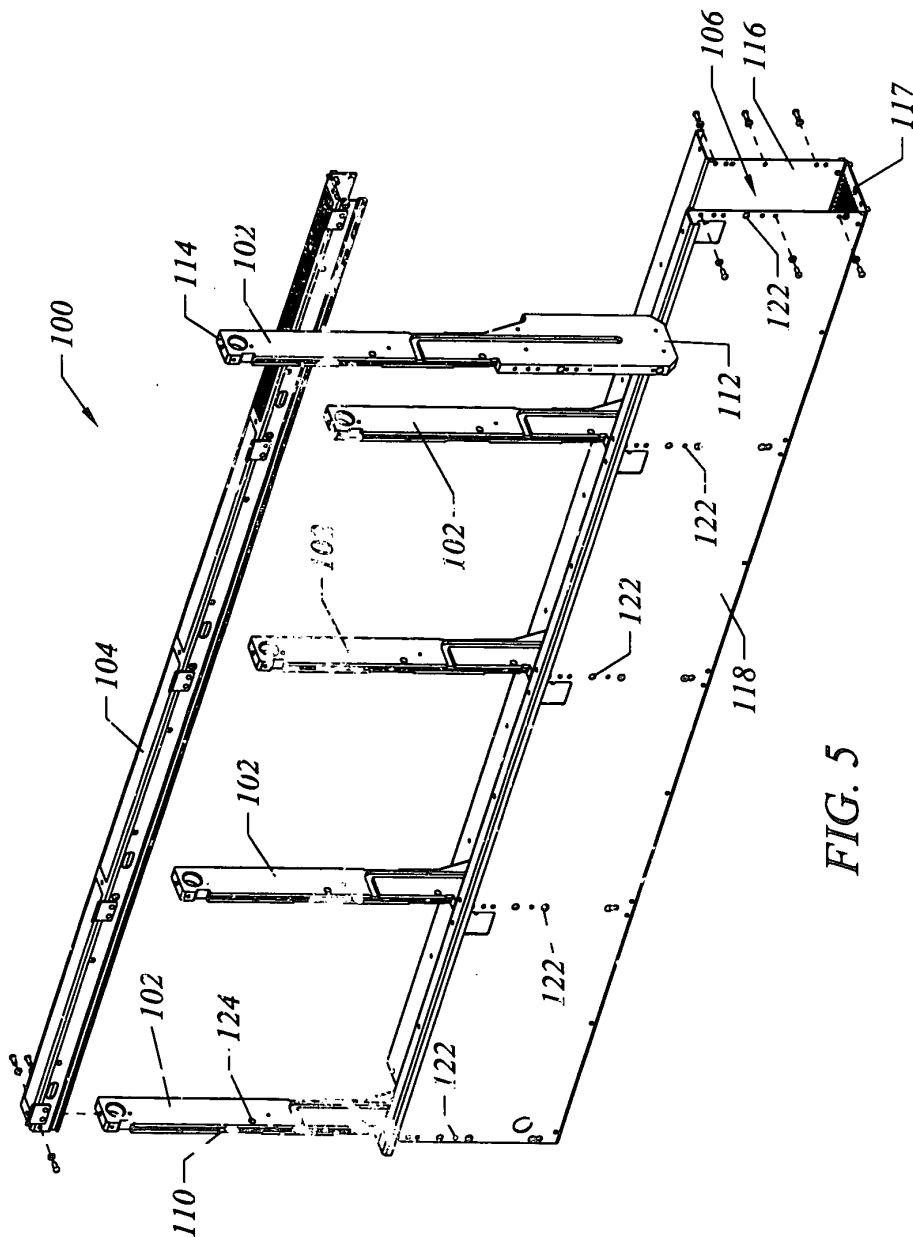


FIG. 5



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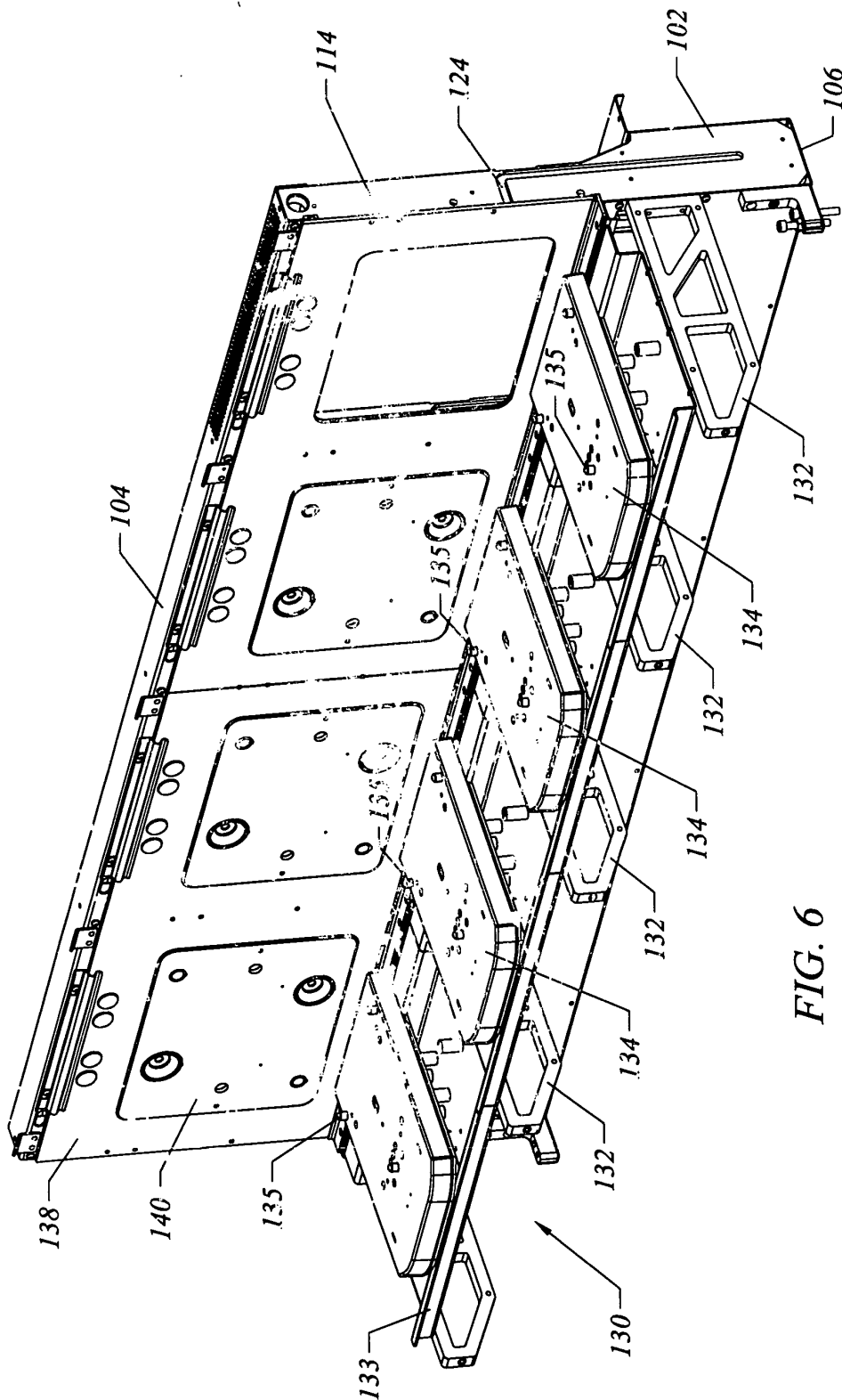


FIG. 6

200E20 2604800T



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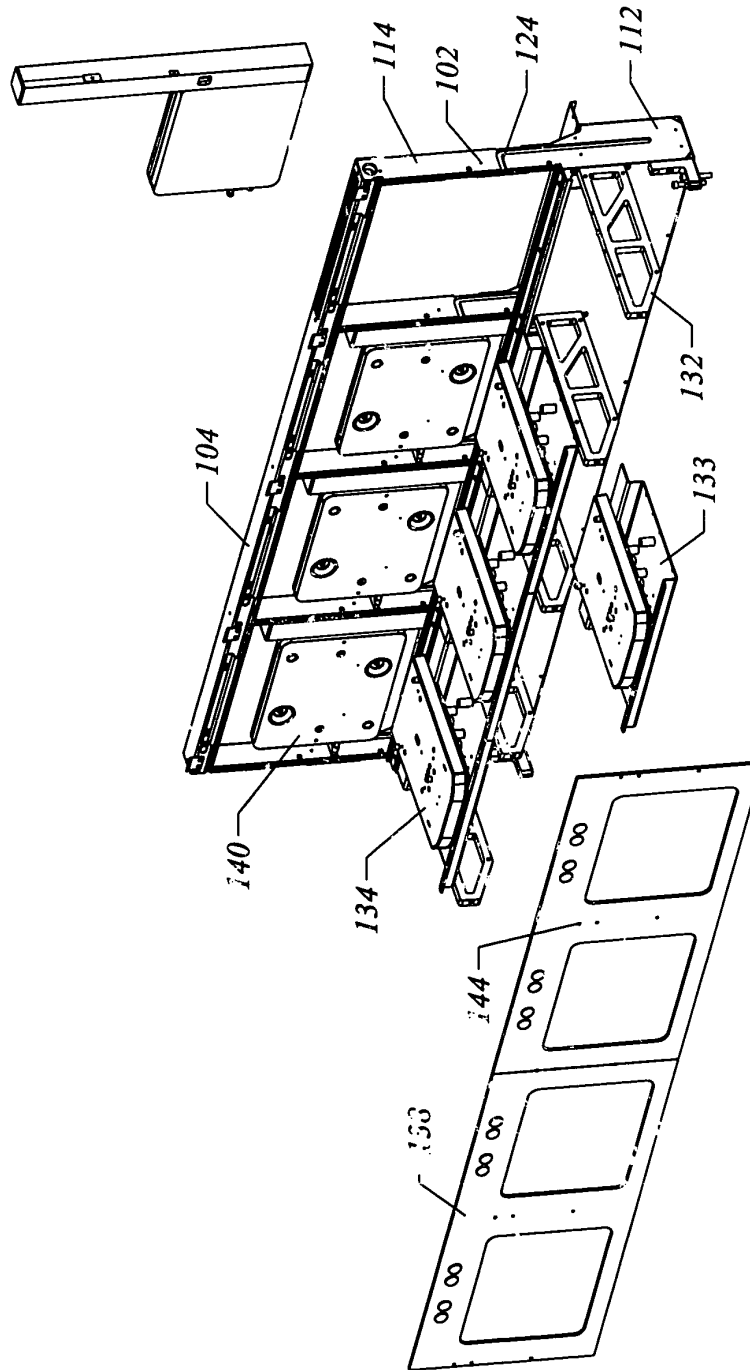


FIG. 7

200E20 26043001



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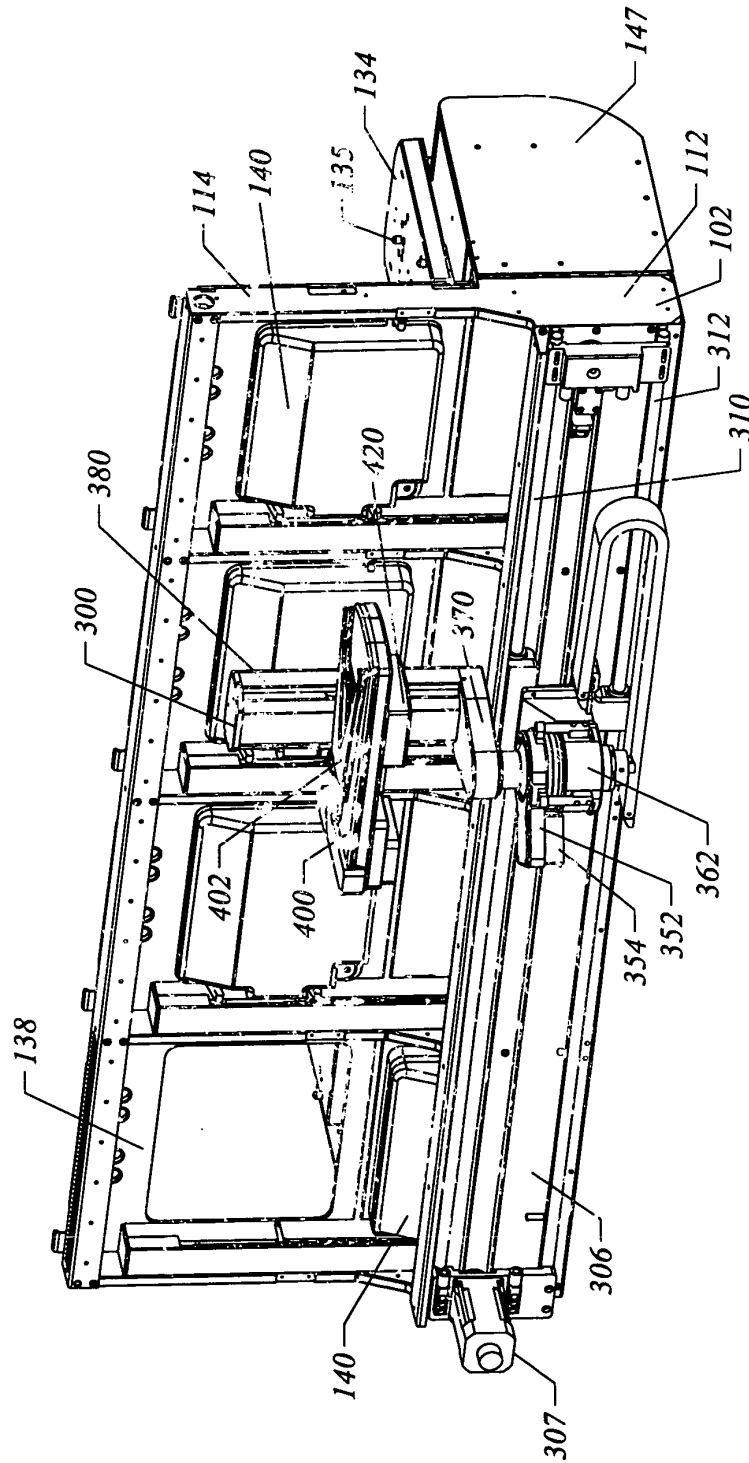


FIG. 8

20020730 26028001



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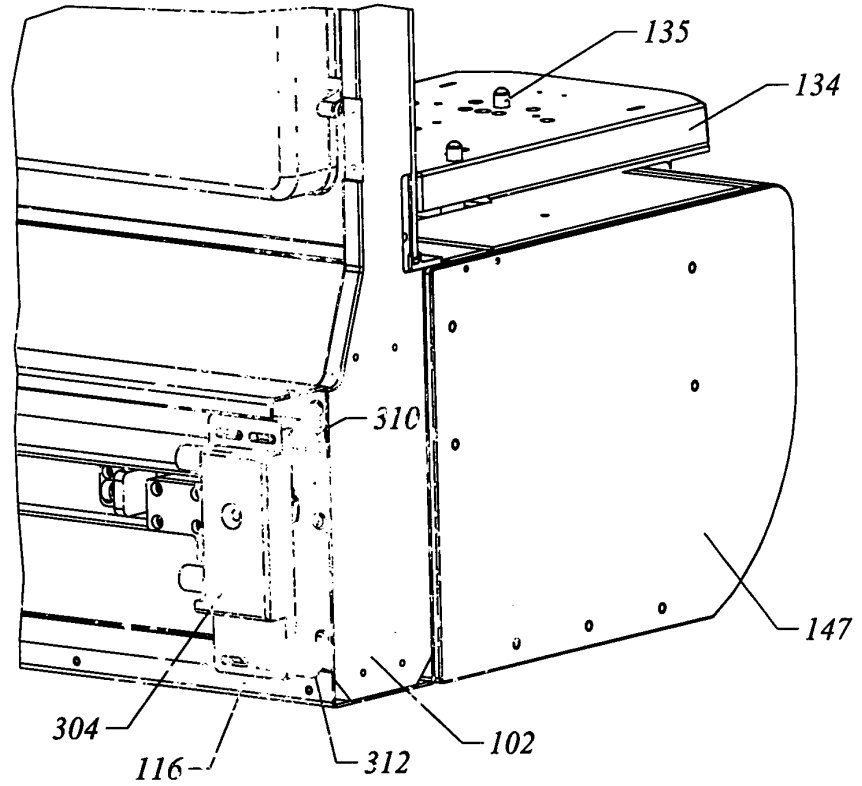


FIG. 9

10087092, 073002
2002/03/26

200E40" 2604800T



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Title: SEMICONDUCTOR MATERIAL HANDLING SYSTEM
Inventor: Anthony C. Bonora Docket No.: 34741
Serial No.: 10/087,092 Attorney: Scott D. [redacted]
Filed: March 1, 2002 Telephone: 415-984-8700
Sheet 10 of 34

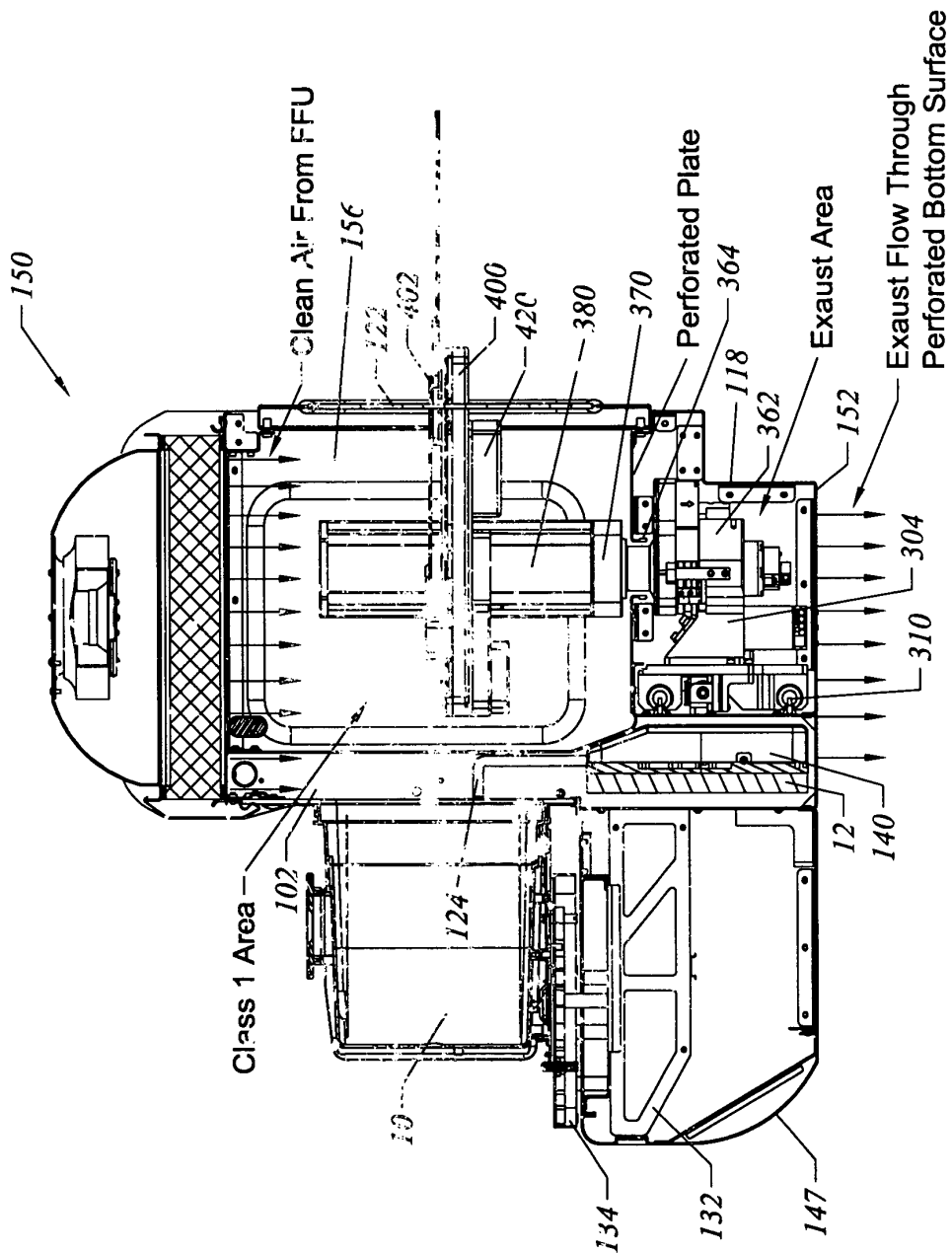


FIG. 10



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20020720 26023001

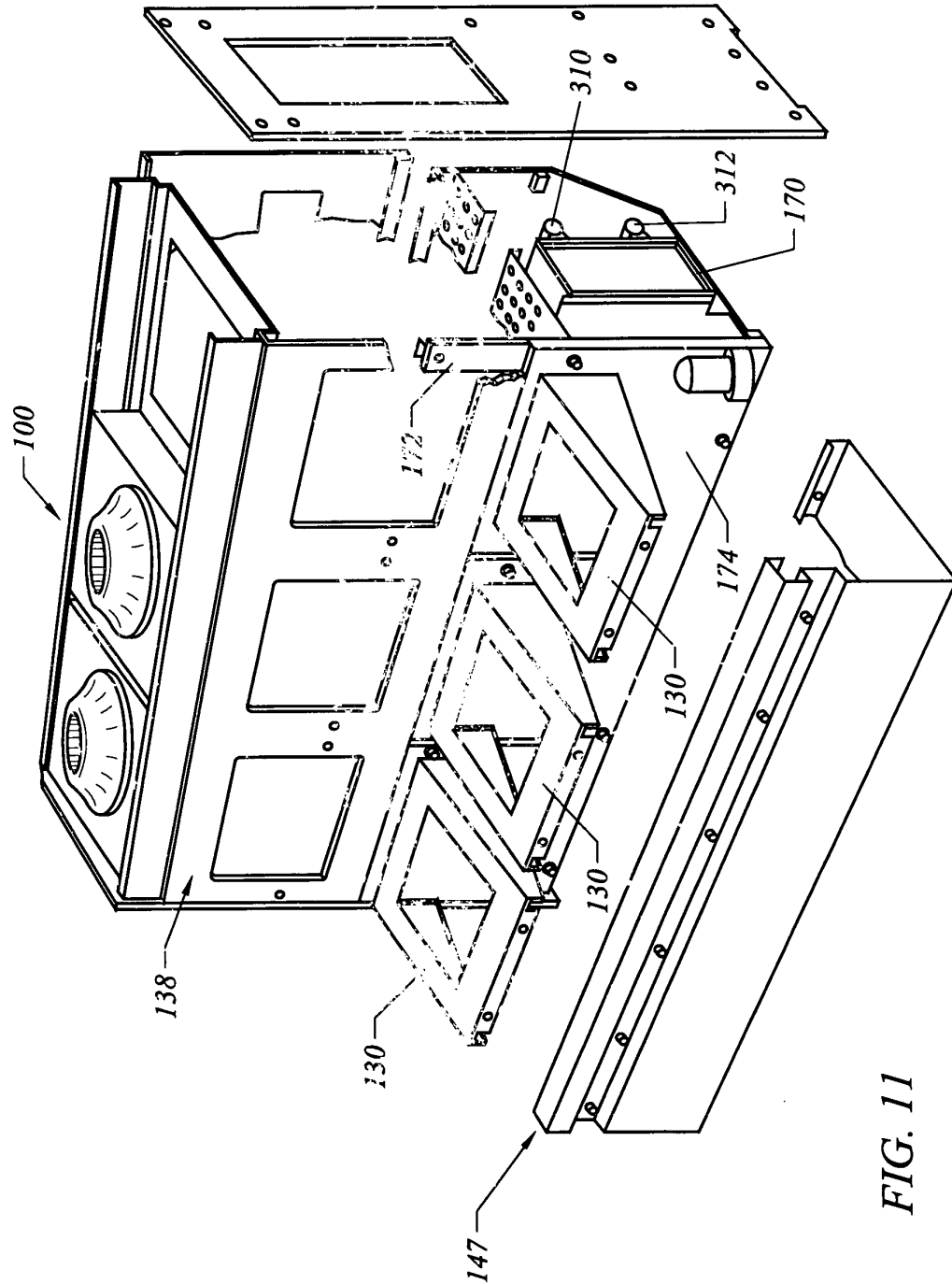


FIG. 11



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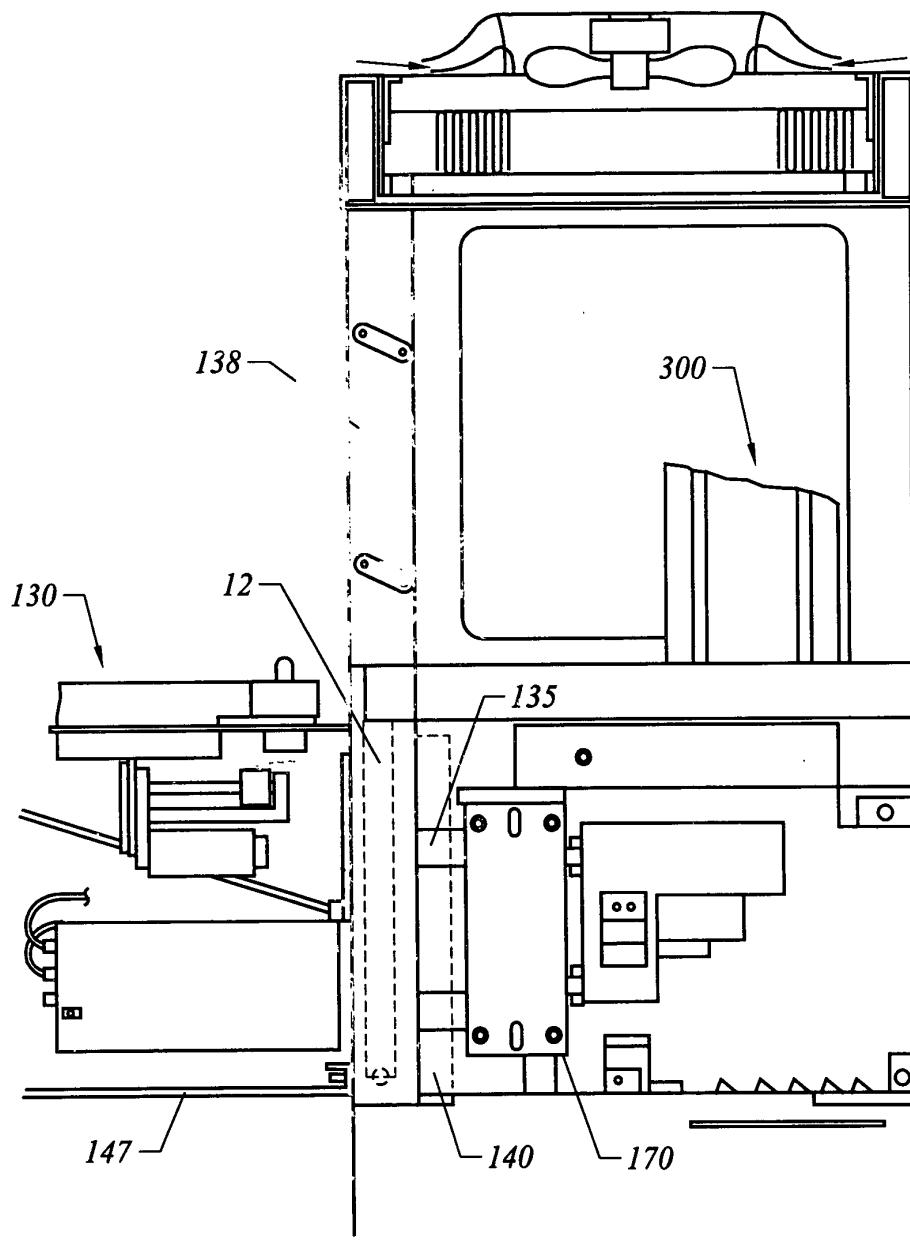


FIG. 12

10087092-26048001



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2002/0726043001

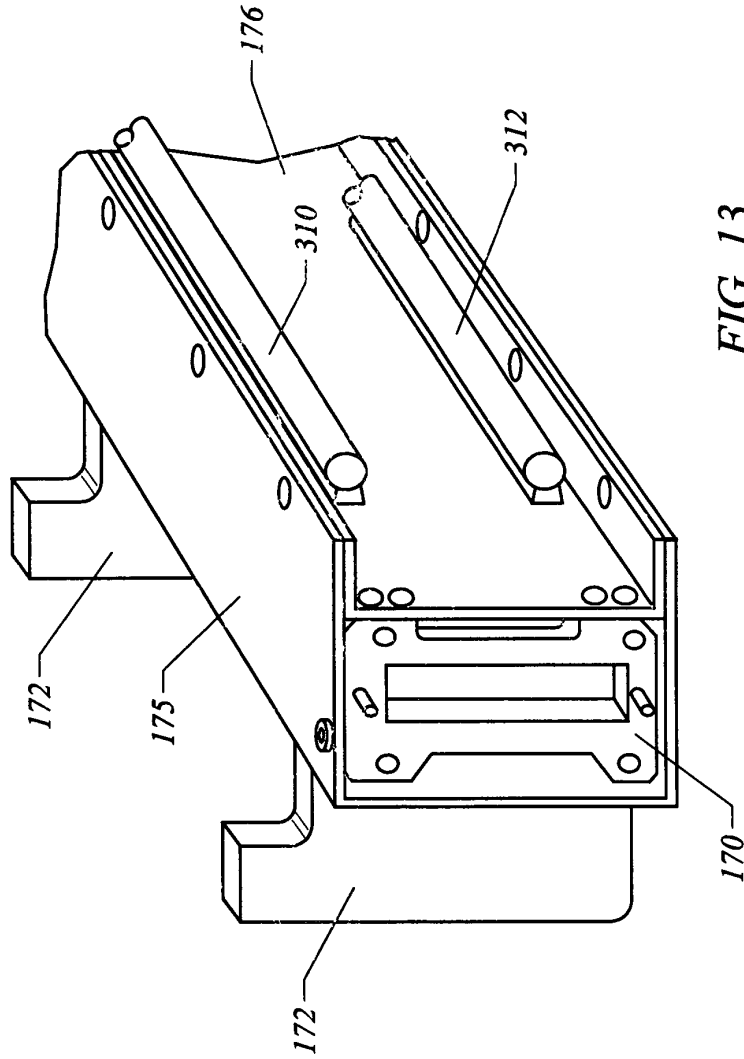
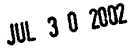
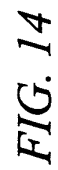


FIG. 13





10303-0700



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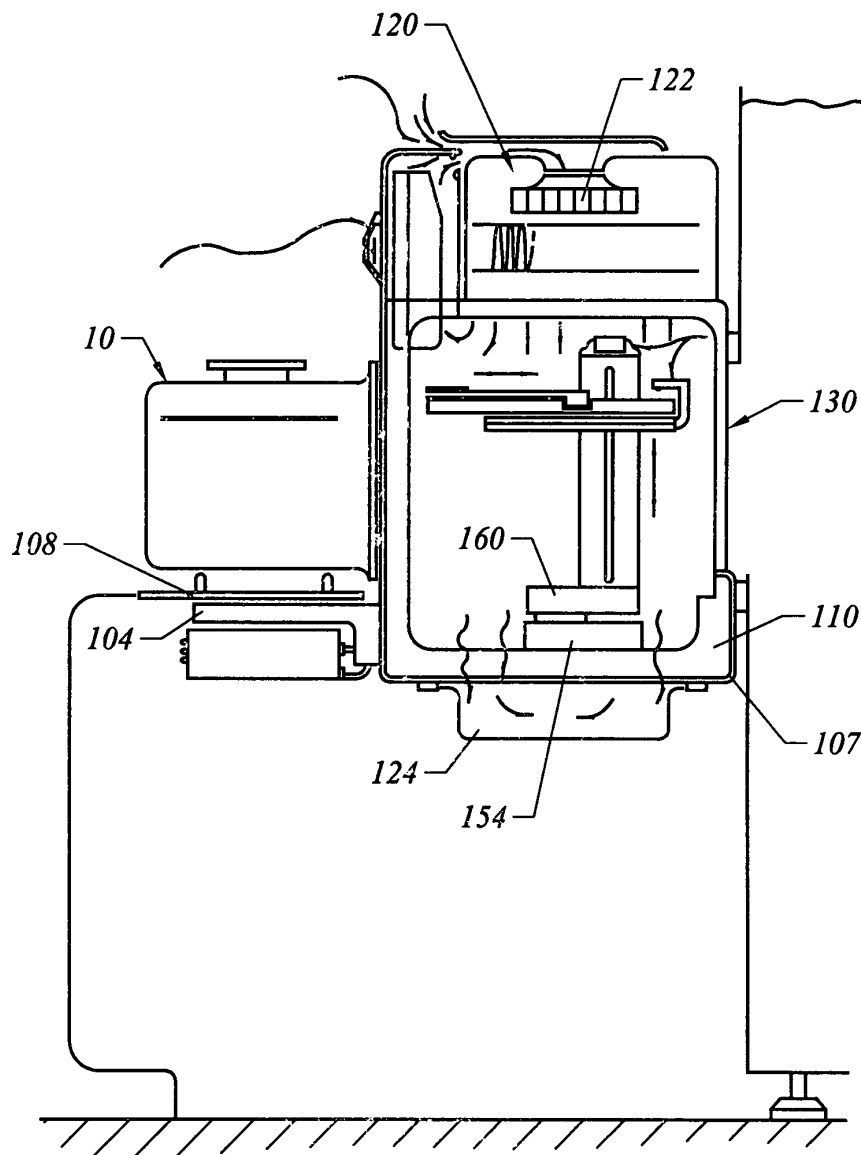


FIG. 15



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Title: SEMICONDUCTOR MATERIAL HANDLING SYSTEM
Inventor: Anthony C. Bonora Docket No.: 34741-
Serial No.: 10/087,092 Attorney: Scott D. S.
Filed: March 1, 2002 Telephone: 415-984-8700
Sheet 16 of 34

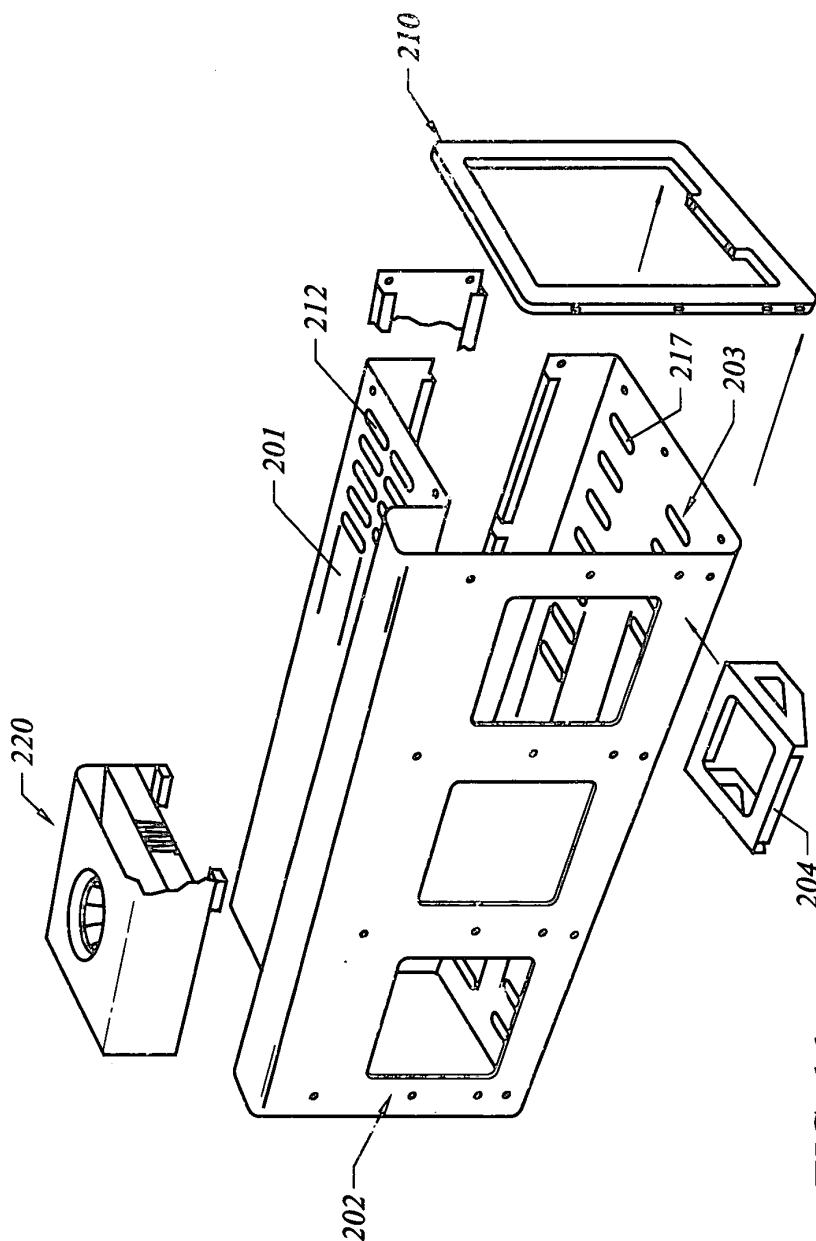


FIG. 16

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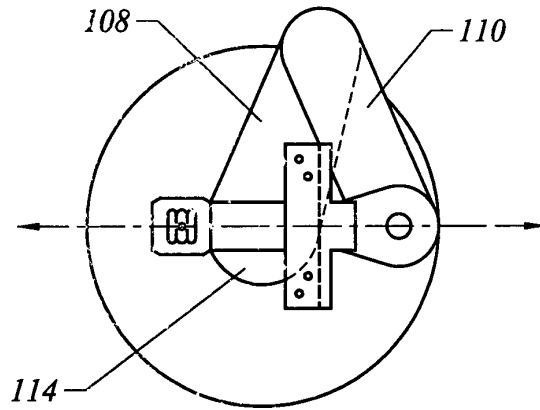


FIG. 17A
(Prior Art)

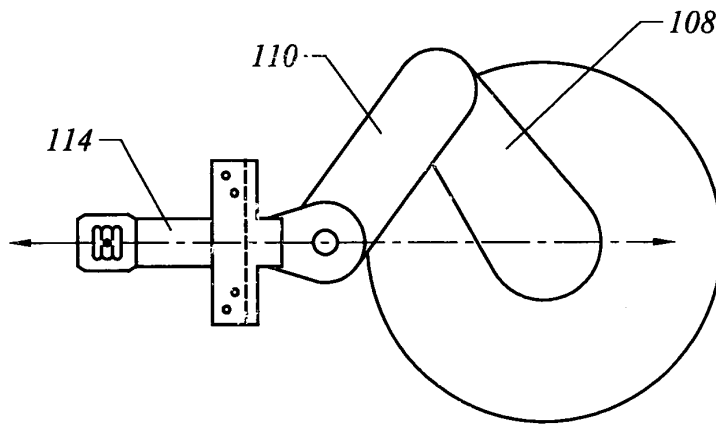


FIG. 17B
(Prior Art)

10087092.07001

Title: SEMICONDUCTOR MATERIAL HANDLING SYSTEM
Inventor: Anthony C. Bonora Docket No.: 34741-
Serial No.: 10/087,092 Attorney: Scott D. Sarna
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Sheet 18 of 34



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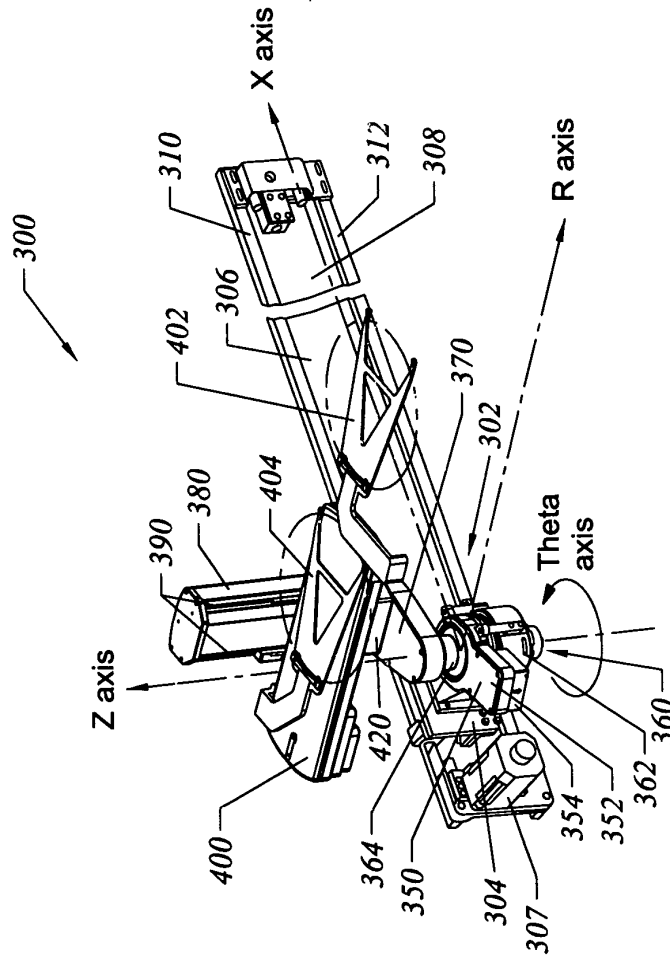


FIG. 18



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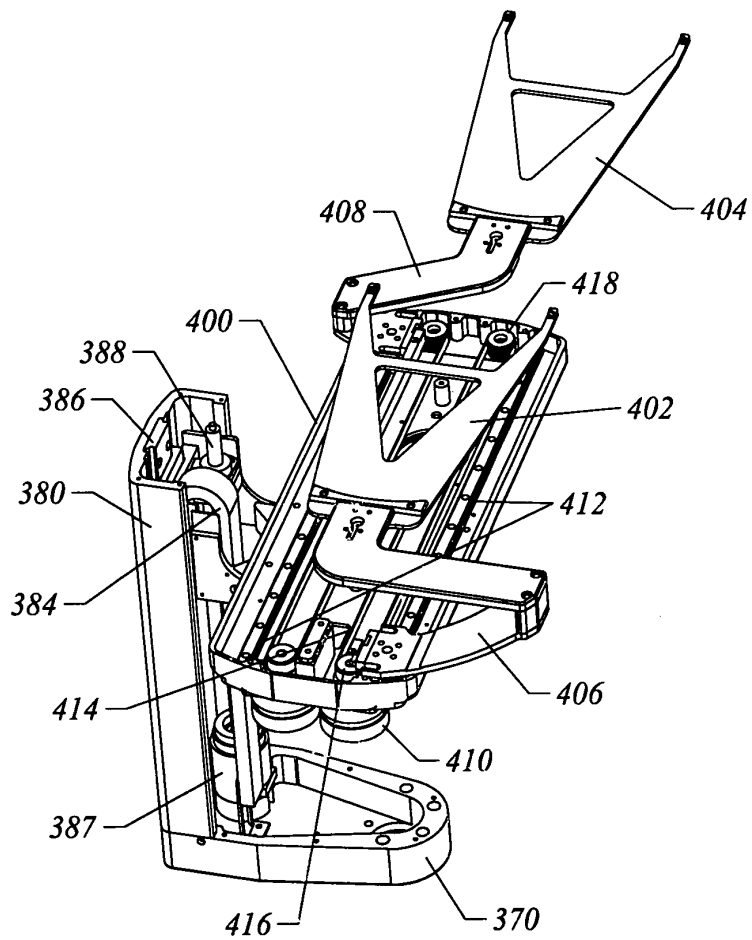


FIG. 19



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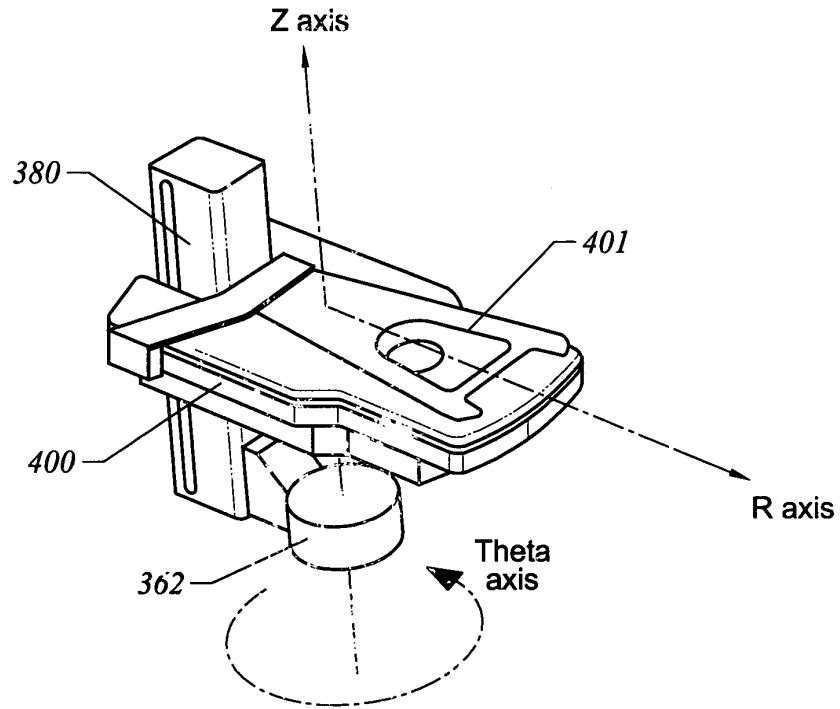


FIG. 20

10/087092 073002
20020726078001



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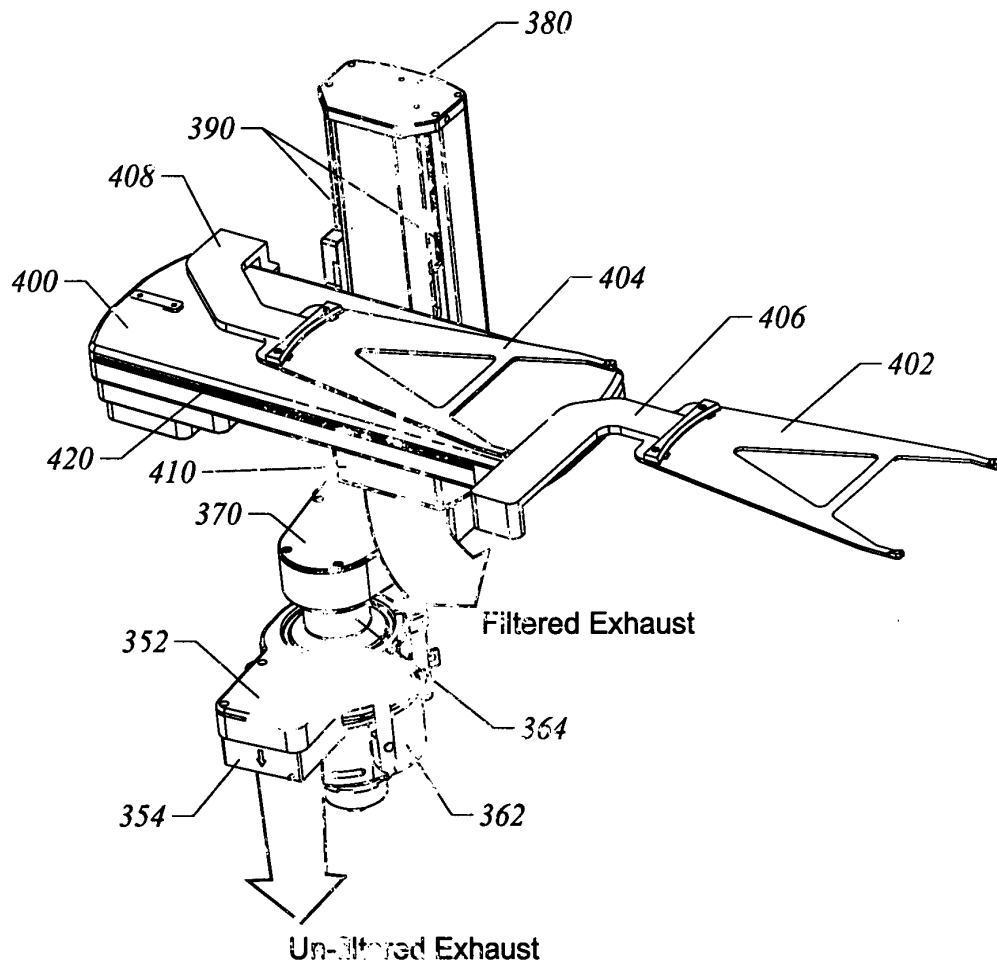


FIG. 21

20020326028001



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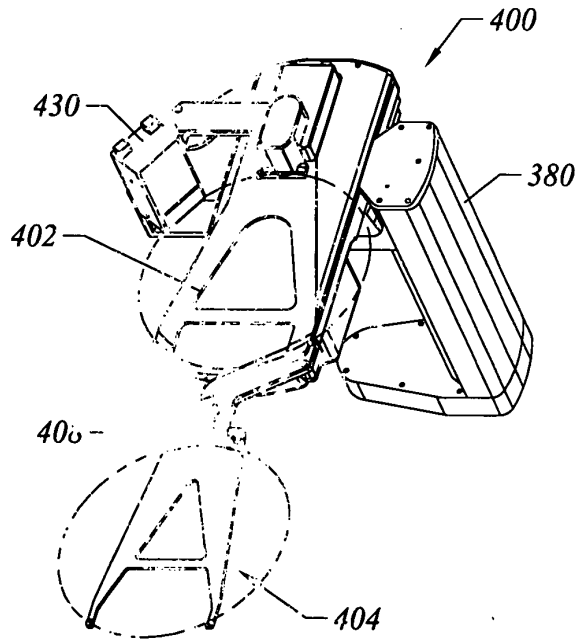


FIG. 22A

10087092 073002
2002/07/26



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20020301 26048001

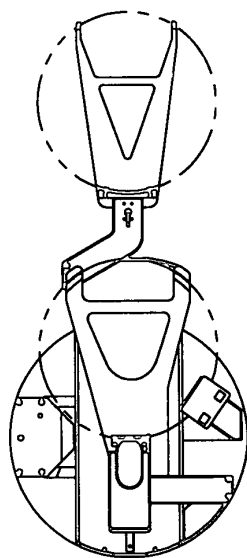


FIG. 22B

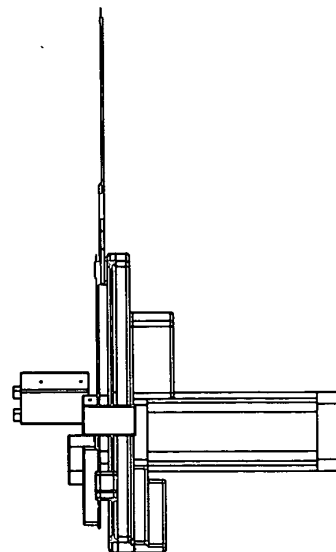


FIG. 22C

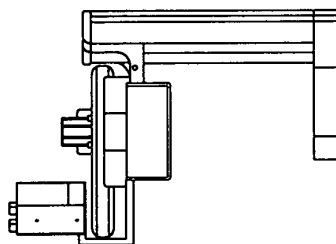


FIG. 22D



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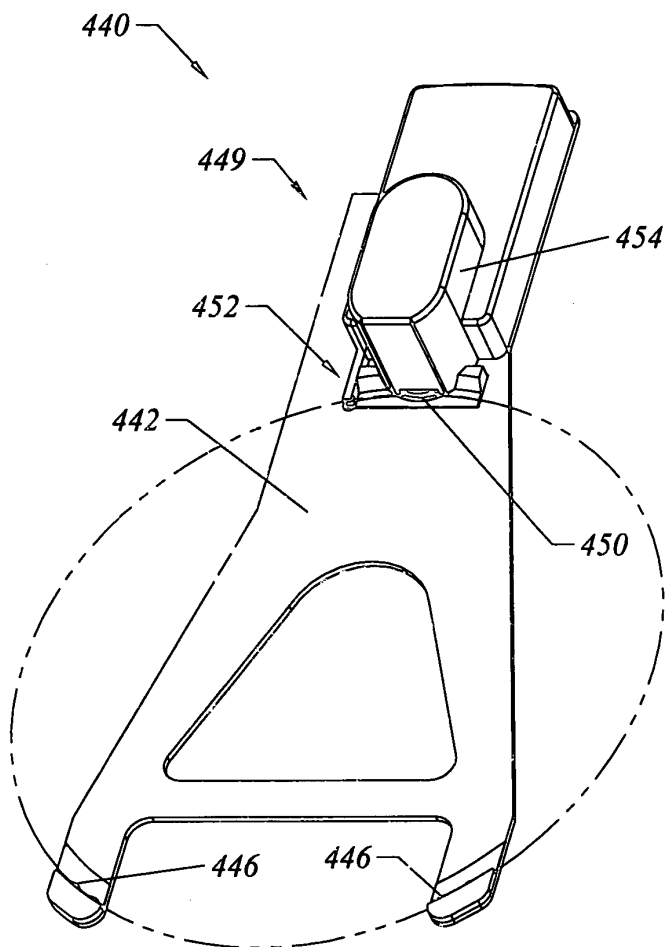


FIG. 23

20087092 26078001



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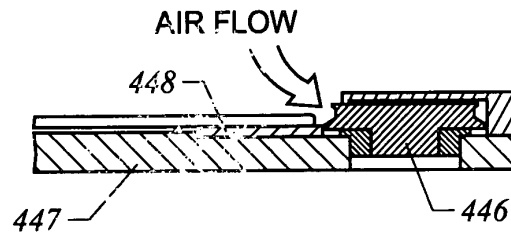


FIG. 24A

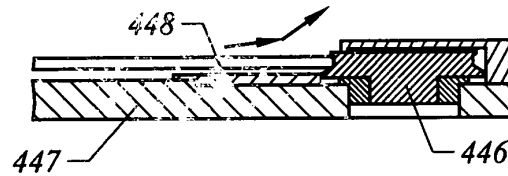


FIG. 24B

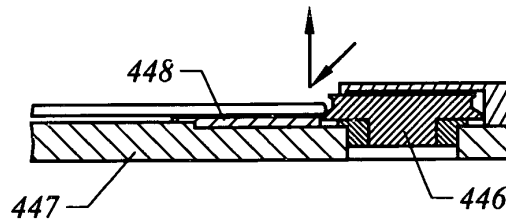


FIG. 24C

10087092-073002



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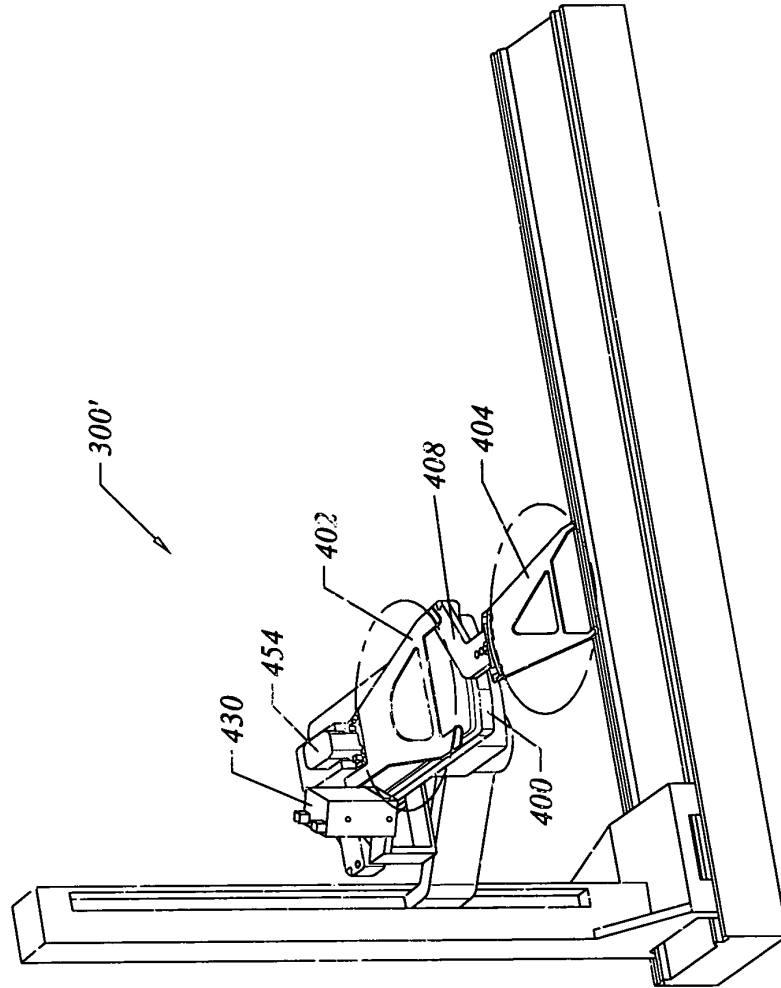


FIG. 25

200E20" 2604800T



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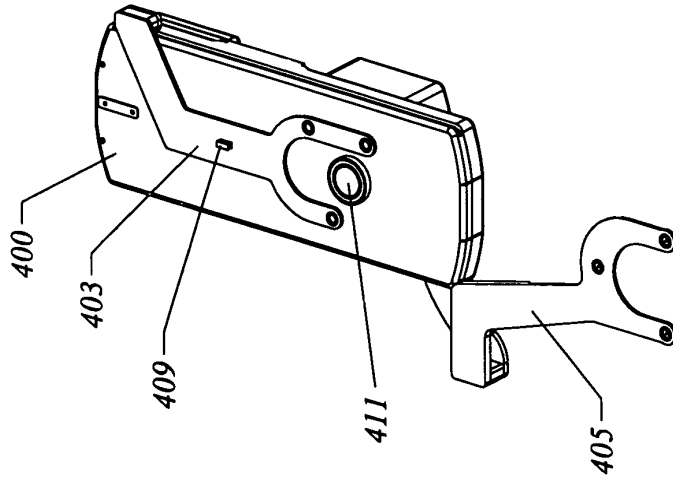


FIG. 26B

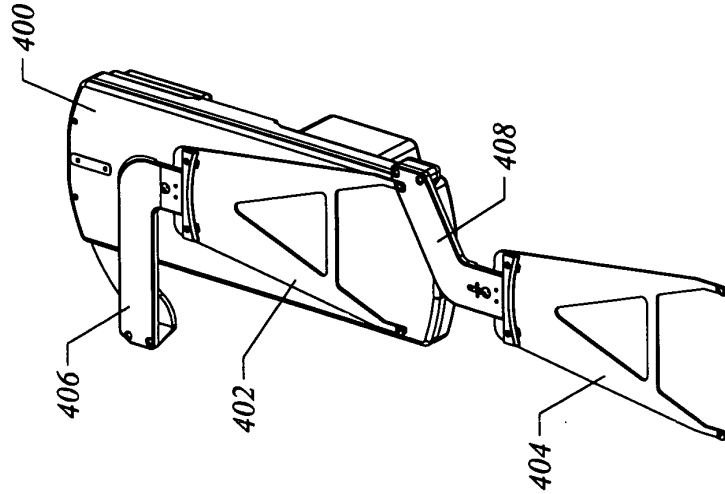


FIG. 26A



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Conventional Linear Slide Robot

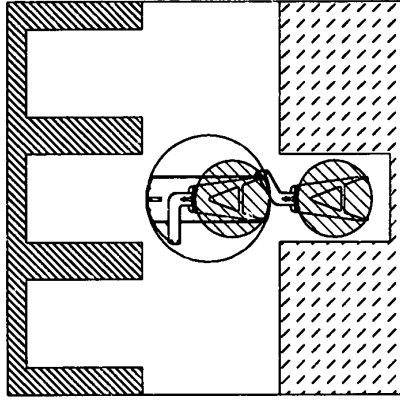
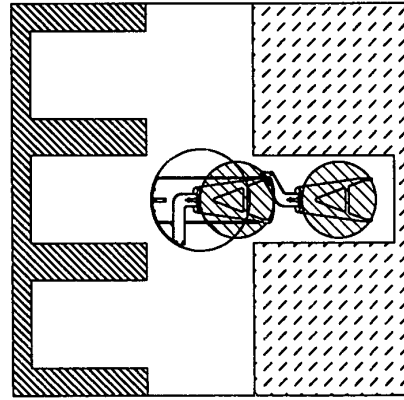


FIG. 27A

Off-Center Side-Body (50mm offset)



EFEM Process Tool

FIG. 27B

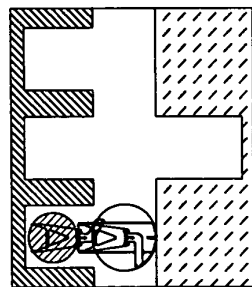
200E/0" 2604800T



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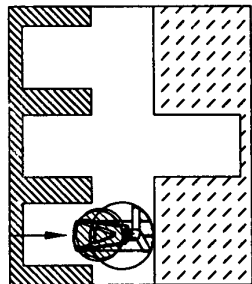
Title: SEMICONDUCTOR MATERIAL HANDLING SYSTEM
Inventor: Anthony C. Bonora Docket No.: 3474
Serial No.: 10/087,092 Attorney: Scott D. [redacted]
Filed: March 1, 2002 Telephone: 415-984-8700
Sheet 29 of 34

Example motion sequence for rapid swap slide-body with off center rotation axis.



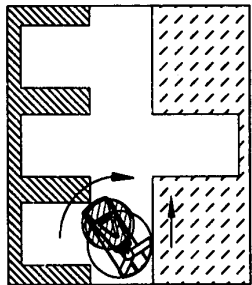
lift wafer at
load port 1

FIG. 28-1



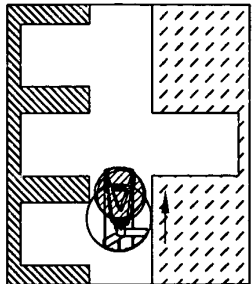
retract radial axis

FIG. 28-2



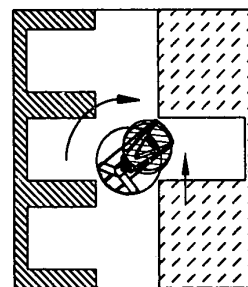
rotate theta axis
and move X axis
back to avoid
collision

FIG. 28-3



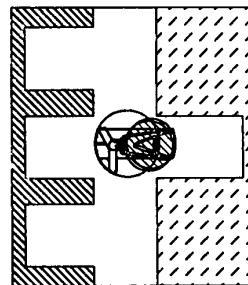
move X axis
forward toward
process station

FIG. 28-4



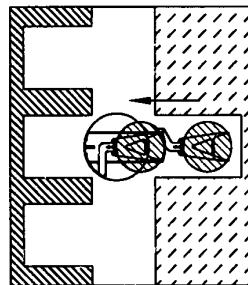
rotate theta axis
and move X axis

FIG. 28-5



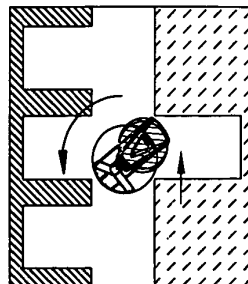
wall for process
to complete

FIG. 28-6



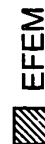
swap processed
wafer for new
wafer ready
for process

FIG. 28-7



retract radial
axis, move X and Theta

FIG. 28-8



Process Tool





Title: SEMICONDUCTOR MATERIAL HANDLING SYSTEM
Inventor: Anthony C. Bonora Docket No.: 34741-774
Serial No.: 10/087,092 Attorney: Scott D. Sanford
Filed: March 1, 2002 Telephone: 415-984-8700
Sheet 30 of 34

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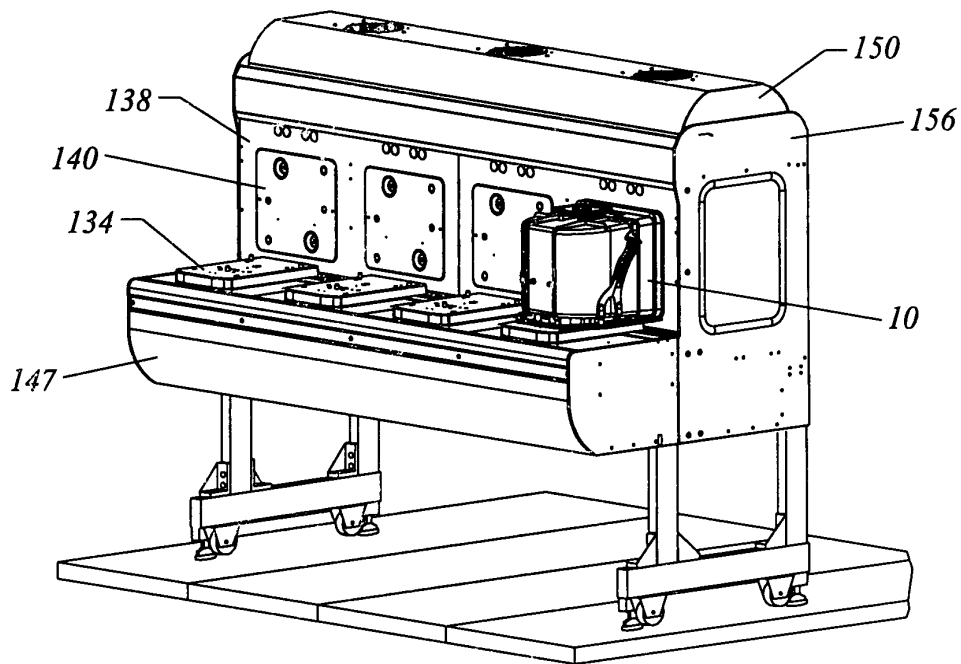


FIG. 29A

10087092-073002



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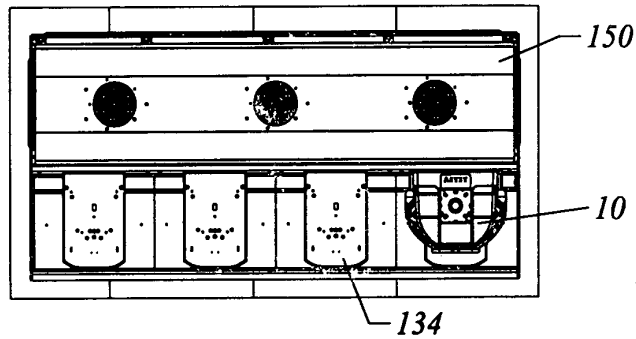


FIG. 29D

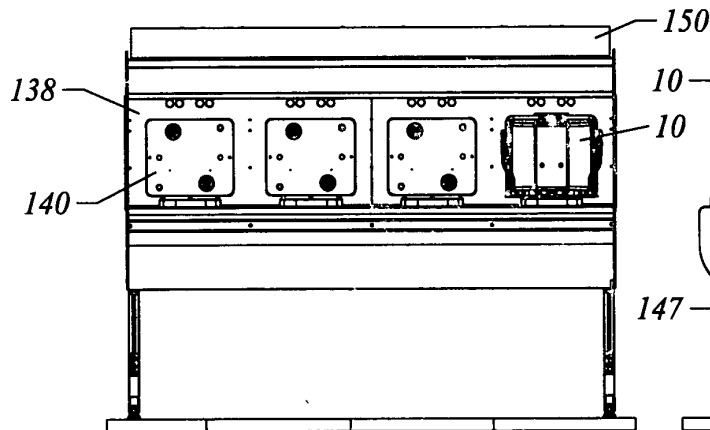


FIG. 29B

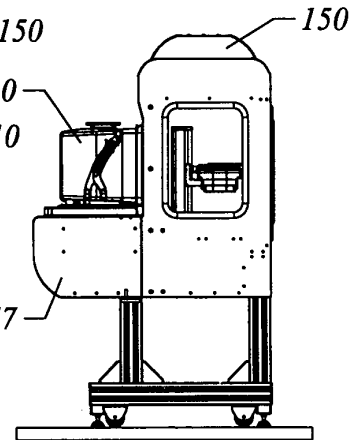


FIG. 29C

10087092-07002



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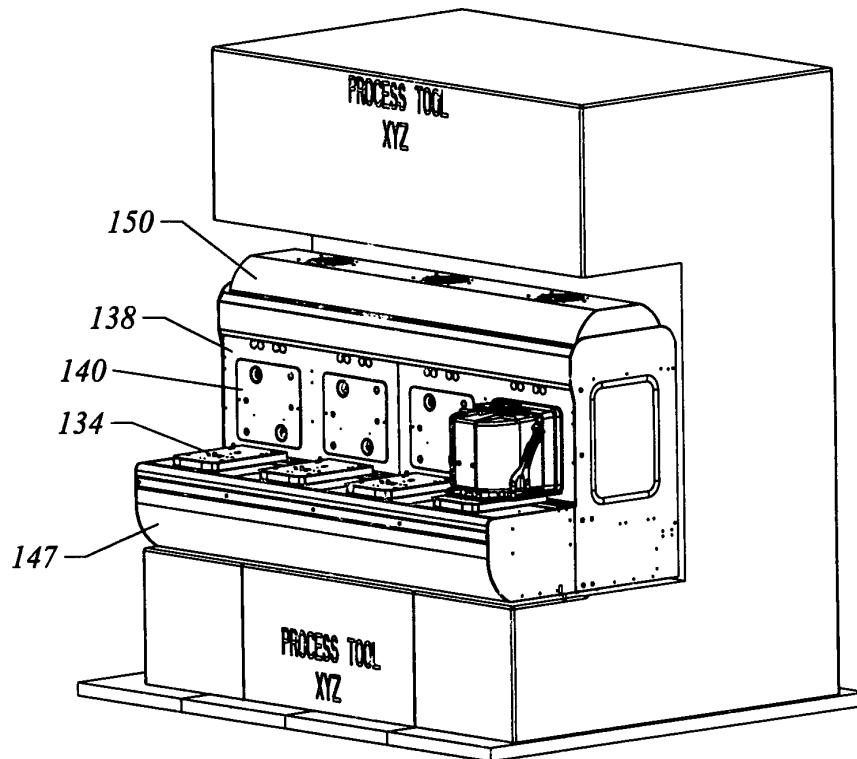


FIG. 30A

10087092.073002



Title: SEMICONDUCTOR MATERIAL HANDLING SYSTEM
Inventor: Anthony C. Bonora Docket No.: 34741-774
Serial No.: 10/087,092 Attorney: Scott D. Sanfor
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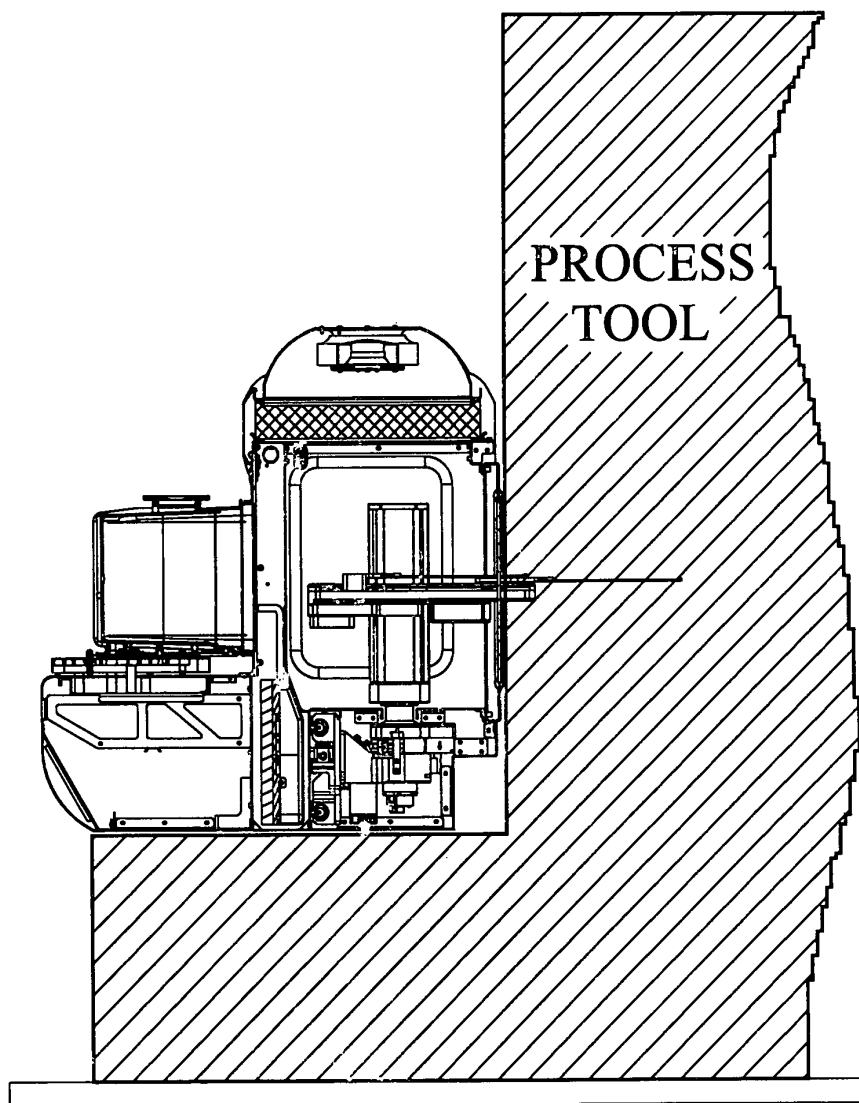


FIG. 30B



Title: SEMICONDUCTOR MATERIAL HANDLING SYSTEM
Inventor: Anthony C. Bonora Docket No.: 34741-77
Serial No.: 10/087,092 Attorney: Scott D. Sanborn
Filed: March 1, 2002 Telephone: 415-984-8700
Sheet 34 of 34

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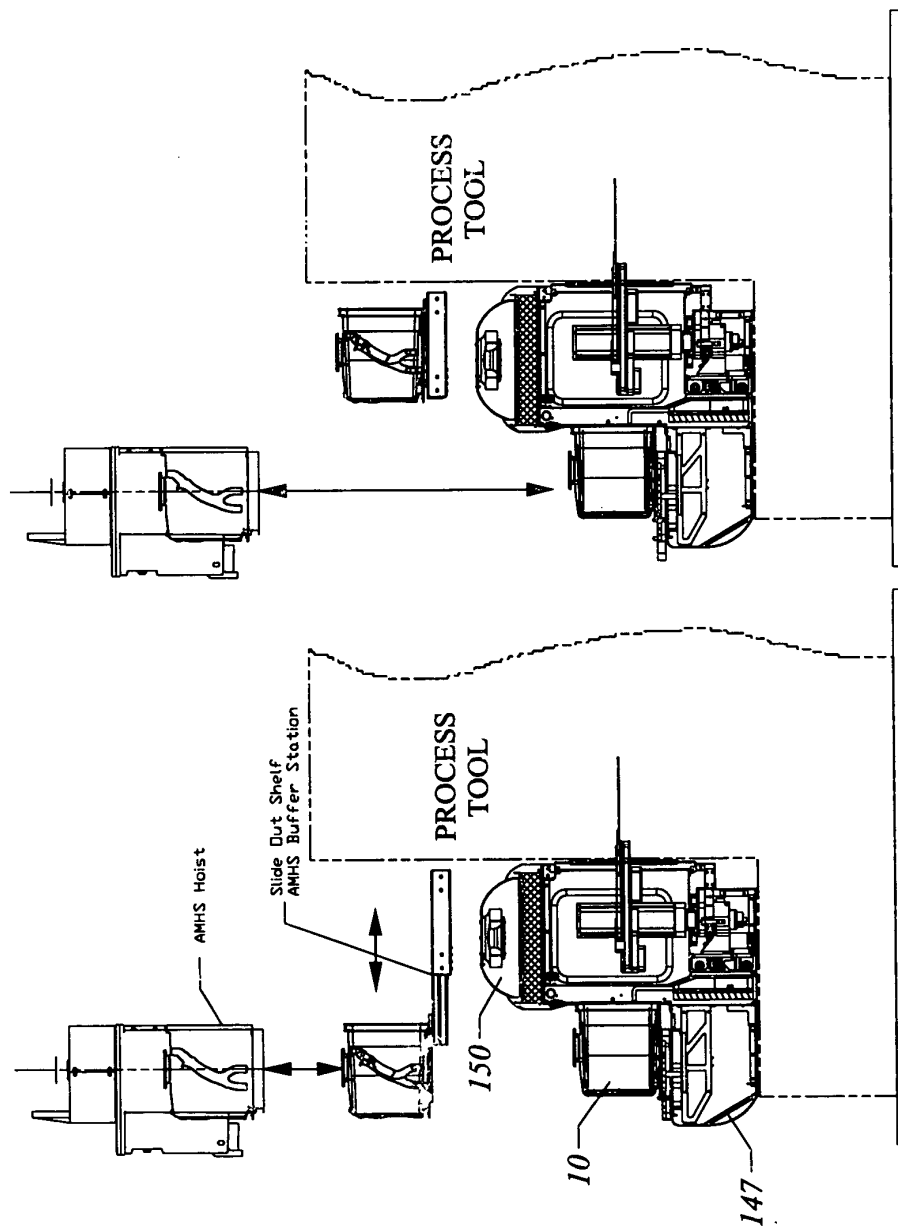


FIG. 31

2002/07/26 08:00